



KAPITEL 4 / CHAPTER 4⁴

USE OF INTERACTIVE LEARNING TECHNOLOGIES AND TOOLS IN THE TRAINING OF QUALIFIED SPECIALISTS

DOI: 10.30890/2709-2313.2024-26-00-030

Introduction

The modern world is evolving rapidly, and along with it, the requirements for the quality of specialists' training in various fields are growing. One of the key components of successful training of young specialists is effective teaching methods aimed at developing the necessary skills and competences. In this context, the use of interactive teaching methods in the training of qualified specialists is a relevant issue.

The modern education tries to balance traditional methods with interactive approaches. Obviously, both of these approaches have their advantages and disadvantages, and a combination of them may provide the best result. Interactive learning methods allow students to develop critical thinking, problem solving, and communication skills. They can also be effective for training skilled specialists, as they provide an opportunity to gain practical experience and skills necessary to solve real tasks in their field [1]. In a world of rapid changes and technological revolutions, interactive learning methods are becoming increasingly important for training skilled specialists who must be ready to adapt and solve new tasks. They promote active learning and independent development, which are key competencies for future professionals.

The theoretical basis of interactive teaching methods includes various pedagogical and psychological concepts and approaches that form the basis for understanding and applying these methods in educational practice. Interactive methods allow learners to actively engage with the material, develop critical and creative skills, collaborate and learn in a social context, making them valuable tools for modern education.

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4.1. Interactive learning methods as a research subject in the field of education

The effectiveness of interactive learning methods has long been the subject of research in the field of education. Both the research and practice show that interactive learning methods can be very effective in achieving learning goals and improving the level of understanding and acquisition of material. Learners can be more motivated because they see a specific goal and interesting tasks that create opportunities for cooperation and competition. This can include discussion of concepts, case studies, problem solving, and other types of active learning. Interactive learning methods can stimulate the development of critical thinking and analytical skills, as students are required to argue their views, solve problems and make decisions. This contributes to the development of cooperation and communication skills, which are important in the modern world.

The word “interactive” comes from the English words “inter” – mutual and “act” – to act. Thus, interactive means capable of interaction and dialogue. Interactive learning is a specific form of organisation of cognitive activity, with the intended goal of creating comfortable learning conditions in which each student feels successful and intellectually capable [2].

So, the students are actively involved in the learning process, not just receiving information. They can ask questions, express their opinions, discuss concepts and come up with their own ideas. Interactive learning promotes dialogue between the educator and the students, as well as among the students themselves. They can exchange ideas, explore issues together and solve problems in groups. Learners usually solve tasks and problems that stimulate their critical thinking and creativity.

Teaching methods are divided into passive ones – most often listening to theoretical information with feedback through questionnaires, independent work and active ones – a form of interaction between students and the educator, in which participants in the educational process interact during the class and act not as passive listeners, but as active participants. Recently, some researchers have begun to distinguish interactive teaching methods, although it is sometimes believed that active



and interactive methods are identical [3].

It is important to consider the evaluation of interactive learning, as well as providing feedback to learners to improve their learning. Interactive learning can range from small elements of interactivity in the classroom to a complete transformation of the educational process. It is evident that interactive learning creates a favourable atmosphere for engaging learners in active learning and developing their skills.

Thus, interactive learning is learning that takes place under the condition of constant interaction of all participants in the educational process. It is a social order where both the student and the educator are equal subjects of the educational process, and they understand and reflect on what they know and are able to use. The organisation of interactive learning involves modelling various life situations, joint problem solving based on the analysis of circumstances and the relevant situation, and the use of role-playing games.

Today, with the help of modern means of information and communication technologies, educators can create their own educational and methodological complex and conduct a memorable creative lesson, involving students in its creation. The volume of knowledge and technologies is growing, and they are being transformed into all spheres of society, and there is a corresponding shortage of highly qualified specialists who meet modern requirements. The organisation of the educational process in modern conditions is practically impossible without the use of information technologies of communication and interaction between people [4].

4.2. Use of interactive learning technologies

The technology and the tool of interactive learning is the very organisation of the learning process, which makes it impossible to not participate in the process of learning the educational material. Each student has a specific task for which he or she must report publicly. The quality of the task set by the educator to the group depends on this activity of each student.



Two principles distinguish technology from a methodology or a tool:

1. Guarantee of the result.
2. Designing the future educational process.

Technology, unlike a tool, does not allow for variability, it cannot avoid certain aspects, does not involve searching, attempts to make certain mistakes. It is characterised by constant feedback and adjustments to further activities in the classroom, and it has a clearly expected and planned outcome. Interactive learning serves as a special form of organising cognitive activity, which has a specific goal – to create comfortable conditions in which each student feels successful, their intellectual capabilities [5].

The use of interactive technologies is not an end in itself. It is only about creating an atmosphere in the classroom that best promotes communication, understanding, and goodwill, and makes it possible to truly implement person-centred learning.

To work effectively and use interactive technologies, cover all the necessary material, the educator must plan the work carefully. Namely, to conduct preliminary preparation of students for a specific task: to read, think over, study the necessary additional literature, and complete independent tasks. It is necessary to select effective and interactive exercises for the lesson that would give students the key to mastering the knowledge and topics. During interactive exercises, the educator gives students the opportunity to think carefully about the tasks so that they perform them seriously, not mechanically or playfully. The educator should use one or two interactive activities per lesson, not a whole kaleidoscope. A prerequisite is to hold a discussion or debate on the results of the interactive exercise. The educator can conduct blitz surveys, give home exercises for self-studying on the topics that were not related to the interactive exercises.

For example, the advantages of interactive learning using the LearningApps service are that all users of the group are involved in the work, learning to work in a team, they develop a friendly attitude towards the opponent, everyone has the opportunity to express their opinion, a large amount of educational material is mastered in a short time, tolerant communication skills are formed, students learn to express their



opinions and find an alternative solution to the problem [6].

In order to control the course of learning based on interactive technologies, the educator should be well prepared in advance. The educator should study the programme material carefully, including additional material, should develop a lesson plan in detail, determine the timing, the roles of learners, prepare specific questions and possible answers to them, and develop criteria for evaluating the effectiveness of the lesson. The educator should create a favourable climate for students during the study of the topic by selecting the most interesting materials, problems, announcing the expected results of the lesson and the criteria for assessing the work of students. The educator should also provide various methods of encouraging students' attention, setting them up for work, maintaining the discipline necessary for the favourable work of the whole class, which can be facilitated by various warm-up exercises, written distribution of roles between them in groups, etc.

With the skilful implementation of interactive learning technologies, all students can be encouraged to work, they contribute to the development of socially important skills of teamwork, discussion, interaction, debate, and deepen motivation. When these technologies are successfully implemented, the students acquire a culture of discussion. They develop the ability to make joint decisions and improve communication.

The peculiarity of the use of interactive methods in the design of the learning space of higher education is that they are binary, that is, identical to certain forms of learning, which is “explained by the multifunctionality of pedagogical phenomena and processes” [7].

The level of students' perception of the material changes qualitatively – it acquires a personal meaning, instead of “learn”, “remember” it becomes “think”, “apply”. The level of mastery of mental operations – analysis, synthesis, generalisation – changes qualitatively.

4.3. Use of digital platforms for interactive learning

Interactive learning incorporates various technologies and tools to create an active



and engaging learning environment. Electronic platforms in interactive learning play an important role in creating an active and effective learning environment that facilitates interaction between students and educators, as well as providing access to various resources and learning tools. Here are some of the popular e-platforms for interactive learning [8]:

1. Moodle is one of the most popular platforms for creating virtual learning environments. It allows educators to create online courses with assignments, tests, discussion forums and other interactive components.

2. Blackboard is a popular learning platform that has a wide range of tools for creating interactive courses and collaborative learning.

3. Canva is a course creation and collaboration platform that provides opportunities to use the interactive elements such as discussions, assignments, and group work.

4. Google Classroom is a free learning platform that integrates with Google Apps. It allows educators to create classes, add assignments and learning materials.

5. Edmodo is a social network for learning that allows educators and students to communicate, share, and collaborate online.

6. Schoology is a platform for learning and managing educational materials that promotes interactive and collaborative learning.

7. Adobe Connect is a video conferencing and webinar tool that can be used for online classes and discussions.

8. Zoom is a popular video conferencing and distance learning tool that allows students and educators to interact in real time.

4.4. Digital tools of interactive learning

The use of digital technologies in the educational process plays a significant role and act as interactive learning methods. So, for example, V. Volynets highlighted the possibilities and advantages of using virtual reality technologies in modern education. The scholar noted that virtual reality technology creates new challenges and



opportunities for the educational industry, which contributes to its technological and effective development [9].

Virtual reality (VR) plays a significant role in interactive learning, facilitating the creation of intensive and reproducible learning environments that allow students to learn and experiment with different concepts and skills. VR is the use of computer technology to create a simulated environment. The term VR now encompasses a multi-valued semantic field with unclear boundaries. VR is usually associated with television, the Internet, electronic means of communication, information system, etc. [10].

Virtual reality enables to create interactive simulations and educational games where students can solve problems and learn practical skills in a real or virtual environment. For example, students can study surgery in a VR environment or engineers can experiment with complex structures. This tool allows students to create virtual laboratories where the learners can conduct experiments and research without real time, safety and equipment constraints. This is particularly useful for studies in scientific and technical fields.

Virtual field trips allow students to visit different places, historical events, or even other planets by exploring them in the VR environment. This enhances learning opportunities and allows students to immerse themselves in the learning material. VR can be used to teach foreign languages by simulating interaction in different language situations. Students can communicate with virtual characters or real native speakers in interactive situations. VR technology can also bring together students from different locations in virtual classrooms or collaborative projects. They can communicate, collaborate and solve tasks together, even if they are far apart. The tool can be used to create situations where students have to make decisions and solve problems. This helps to develop analytical and decision-making skills. VR can be used to teach professional skills such as medical diagnostics, piloting, equipment maintenance, etc. where precision and skills play an important role. Due to VR, interactive learning becomes more enhanced and engaging, contributing to better understanding and absorption of the learning material.



Interactive whiteboards and tablets are important tools in interactive learning as they allow educators and learners to interact with learning material and develop skills in a more engaging way. By interacting with the material, educators can use interactive whiteboards to create interactive presentations where learners can interact with text, images and videos. In problem solving, educators can create problems on the board and learners can solve them using special stylus or gestures. Whiteboards allow educators to demonstrate various processes, such as mathematical calculations, chemical reactions, physical phenomena, etc. Tablets can be used to create interactive textbooks and curricula that allow learners to interact with the material, solve problems and test their knowledge. There are many educational apps for tablets that help students learn different subjects and skills. Tablets allow students to work collaboratively on projects, share notes and learning materials. Interactive whiteboards and tablets allow to conduct virtual classrooms where educators and learners can interact in real time, even if they are far apart. Recordings of classes and video conferences can be easily saved and made available to learners in the future. The educators can use data from interactive whiteboards and tablets to assign tasks to learners based on their level of knowledge and skills. The learners can study the material at their own pace and according to their individual needs and interests. The use of interactive whiteboards and tablets increases interactivity and engagement in the educational process, helping to create a more accessible and personalised learning environment.

The use of *video* and *webinars* is an important component of interactive learning, as these tools allow educators and learners to consume and create content that can be easily shared and discussed in real time. Video lessons can be used to teach learners in a distance learning mode, allowing them to view lessons and materials at home. Learners can watch video lessons at their own pace and multiple times if necessary to ensure better understanding of the material. Video lessons can be in a variety of formats, including lectures, demonstrations, exercises, and more.

Interactive videos are a powerful tool in interactive learning because they allow educators to create engaging and educational video materials that encourage learners to actively engage in the learning process. Students can choose where to go at the end



of the video. For example, they can choose to try a problem, visit an additional section, or move to the next video depending on their answers or interests. The educator can insert questions or tasks right in the middle of the video that students must answer before continuing. This allows the educator to check the understanding of the material and activate the students. The educator can collect information about how students interact with videos and analyze this data to improve the learning process. The educators can also insert links to relevant articles, videos, books or other sources for further study of the topic.

Video conferences and webinars allow students and educators to interact in real time, discuss material, ask questions, and work together on assignments. Virtual guests and experts can join webinars and video conferences to share their knowledge and experience. Videos can be pre-uploaded to learning platforms where students can annotate and discuss important points in the comments. After watching the video, learners can take quizzes and surveys to check their understanding of the material. Video conferences and webinars can be used to collaborate on projects, presentations and reports. Students can share resources and materials for joint work on projects. The use of videos and webinars in the educational process allows for more interactive and engaging learning, where students have the opportunity to consume and create content, interact with it and learn together [11].

Social media and networks play an important role in interactive learning as they enable learners and educators to communicate, collaborate and learn together in a virtual environment. The educators and the learners can create communities on social media platforms such as Facebook, Twitter, Instagram, or specialised social networks for learning. The use of forum technologies and Wikipedia in virtual learning groups allows all participants to create online learning content independently or jointly, which stimulates independent cognitive activity.

The use of social media as a communication platform allows organising independent work of students in extracurricular time. After all, methodologically correct and purposeful involvement of online services in the educational process has “the potential to develop self-regulated independent learning, since learning through



electronic social networks is active, dynamic, student-based and student-directed” [12].

This helps to keep participants connected and share ideas and resources. The participants can discuss tasks and projects in online groups or forums on social media platforms. This helps to solve issues and exchange ideas. The social media allows learners to work together on projects even if they are physically located in different places. They can edit documents together, exchange materials and share their achievements. The social media makes it easy to share learning materials, reading recommendations, videos and other resources. After lessons or webinars, the participants discuss their impressions and ask questions in special groups or comments on posts. The educators use their social media pages to provide additional material, fellowship, and support for students. Social networks allow students to communicate with specialists and experts in various fields for advice, consultation and other useful knowledge. Due to social networks and media, interactive learning is becoming more widely used and helps improve collaboration and knowledge sharing in a virtual environment.

Interactive games and simulations in interactive learning create learning environments where learners can learn and develop skills through play and problem solving. These tools help improve engagement, motivation, and learning. The educational games are also known as “serious games”, these games are created specifically to teach specific skills or concepts. They can be used to teach foreign languages, math, history, scientific concepts, and develop problem-solving, analytical, and critical thinking skills. Simulations allow learners to recreate real situations, explore processes and events, and even solve problems in a controlled learning environment. Simulations are used in medical education, engineering, biology, aviation, and many other fields. Role-playing games allow learners to assume the role of real or imagined characters and interact in an environment that simulates a real or fictional setting. It can be useful for studying history, literature, sociology and other subjects. Economic and business simulations allow students to study economic processes, business management, make decisions regarding financial analysis and planning. For learning foreign languages, there are games and simulations that help



learners improve their reading, writing, speaking and listening skills. Geography games allow learners to learn about the geography, cultures and history of different regions of the world through virtual travel and the study of geographical facts.

On the basis of cloud computing technology, the means and technologies of information and communication networks have been further developed, “on this basis, the subject-technological organization of the information and educational space is carried out, the processes of accumulation and storage of various subject collections of electronic educational resources are organized, the possibilities of providing access and the functionality of which are growing significantly” [13].

Cloud technologies play a key role in interactive learning by providing access to learning resources, tools and platforms from any device and location with internet access. Cloud storage services such as Google Drive, Dropbox, OneDrive, etc. allow educators and learners to store, share and collaborate on learning materials, documents, presentations and other resources. Many learning platforms and learning management systems are cloud-based, allowing educators and learners to easily access learning materials, assignments, observations and discussions from anywhere. The use of cloud technologies in education has made it possible to take the next evolutionary step towards making the educational process more flexible, open and mobile. By influencing the means, methods and forms of organising learning, cloud technologies thereby affect the methodological system of teaching each academic discipline [14].

Cloud technologies enable remote learning and virtual classrooms where learners and educators interact in real time, even over long distances. The analysis and reporting tools available in cloud-based learning systems help educators track learner progress, evaluate their work, and adapt curricula. They scale curricula and provide access to learning to a larger number of learners, including those with limited access to traditional education. The interactive elements such as testing, voice chats and other tools can be easily integrated into cloud-based learning platforms. Cloud technologies allow for automatic updates and synchronisation of learning content and programmes for all users. These technologies provide access to a large volume of learning resources and help create an interactive learning environment where learners can actively interact



with the material and each other to achieve the best learning outcomes.

Interactive e-textbooks are an important element of interactive learning and can significantly increase the effectiveness of the learning process. Such e-textbooks can contain video, audio, animations, and images to help learners better understand the material and retain it in their memory. For example, video explanations or interactive simulations can help visualise abstract concepts. They can include self-check tasks, quizzes and tests so that learners can test their knowledge and get immediate feedback. It can increase motivation to learn by using interactive graphs and charts to demonstrate complex concepts and dynamic changes. Learners can manipulate data and observe its impact. Interactive e-textbooks can include virtual labs or simulations that allow learners to experiment and explore phenomena safely and effectively. Interactive e-textbooks also contain links to additional material, sources, and web resources to help learners expand their knowledge. They can have embedded forums or other communication tools where learners can discuss topics, ask questions, and interact with fellow students and educators. Some interactive textbooks can be tailored to the individual needs of learners by providing additional support material or additional reflection tasks. Educators can track learners' progress using analytical tools and reports provided by interactive textbooks. Interactive e-textbooks allow students to actively engage in learning, learn effectively, and develop independence and critical thinking skills.

Conclusions

Thus, the study of these aspects provides a deeper understanding of the essence of interactive learning and emphasizes its important role in the formation of modern education. The use of various innovative means, such as virtual reality, simulation programs and electronic platforms, virtual tours, interactive whiteboards and tablets, interactive videos and webinars, social media and networks, cloud technologies, interactive games, interactive electronic textbooks contribute to increasing the effectiveness of learning. All these aspects emphasize the importance of interactive learning in the modern educational process and its role in preparing qualified specialists for a successful future career.